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ENDING AND RELATION OF THE MUSCULAR FIBRES IN THE MUSCLES OF MINUTE ANIMALS.

(Mouse, Mole, Bat and English Sparrow). -- Abstract.

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The objects of this paper are to show the length of the fibers in animals so small that none of the muscles are 40 millimeters in length, and also the form and relation of the fibres.

1. In the shortest muscles, as the intercostals and the penniform muscles of the limbs, the fibres extend from tendon to tendon (demonstrated in mouse and sparrow).

2. In some of the longer muscles (4 to 16 mm.) from both trunk and limbs of the mouse and sparrow, a few fibres were traced from tendon to tendon, as with the shortest muscles.

3. In the longer muscles (4 to 27 mm.) from both trunk and limbs of mouse, mole, bat and sparrow, were also found fibres, which, arising either at the tendon of origin or insertion of the muscle with the familiar blunt endings, do not extend to the other tendon, but end within the muscle with a more or less tapering extremity. No fibres were found without at least one end connected with either the tendon of origin or insertion, that is, there were no spindle shaped fibres with both ends within the muscle.

4. The fibres having endings within the muscle were found to be from one half to two thirds the length of the muscle to which they belonged, that is they vary from 3 to 18 mm.

5. The endings within the muscle are of four types: (a) long tapering, unbranched endings (or with only fine processes); these occur frequently in mouse, mole, bat and sparrow. (b) Dichotomously divided endings, both divisions being striated. These were found in mouse and sparrow. (c) Endings which have many striated branches, recalling the tree-like branching of the muscles in the rat's lip and frog's tongue. These were found in mouse, mole and sparrow. (d) Long tapering endings with an occasional short, thick, striated branch; found in mouse and mole.

6. Fibers when of full size were found to give off large branches, (a) within the muscle in mouse and mole, (b) near the tendinous end in mouse and bat.

7. The connection of the endings within a muscle with other fibres is frequently very intimate, and true anastomosing, striated branches were found connecting two contiguous fibres (the anastomosis of fibers demonstrated in the mouse).

8. From the above facts it is seen that in these minute animals (a) in the shortest muscles, as in the larger animals, the fibres extend from tendon to tendon; (b) in the longer muscles, some fibers extend from tendon to tendon, in this respect differing from the larger animals in which the fibers are rarely, if ever, more than 40 mm. long; other fibers arise at a tendon and end within the muscle as with the larger animals, but there are no fibres such as are found in the larger animals with both endings within the muscle; (c) such anastomoses of one fibre with another as occur in the mouse, has not, to my knowledge, been described in any other animal.

9. The form of the endings within the muscle recall the cardiac muscular fibers of cold-blooded vertebrates and of mammalian embryos, while the anastomoses of the fibres, in the mouse at least, suggest the cardiac muscular fibers in adult mammals; hence it seems as though the difference between the skeletal and cardiac muscular fibres may not be so radical as has been supposed.